Notice of Allowability	Application No.	Applicant(s)	
	10/528,729	OISEL ET AL.	
	Examiner	Art Unit	
	Yubin Hung	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☐ This communication is responsive to _____.

2. ☒ The allowed claim(s) is/are *1-9*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 03/22/05
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

JINGGE WU
SUPERVISORY PATENT EXAMINER

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Guy Eriksen on 12/28/06.

2. The application has been amended as follows:

A. Replace the abstract with the following:

> A method is disclosed for measuring similarity between images, comprising the performance of the following steps for each of the images: segmentation of the image into segments, classification of the segments as a function of their orientation to give classes, calculation of a histogram of the number of segments as a function of class, calculation of a histogram of the number of pixels belonging to the segments of one and the same class as a function of class, and comparing, for each image, the histograms calculated above to their respective histograms calculated for each of the rest of the images to give a measurement of similarity.

B. Replace claim 1 with the following:

1. Method of measuring similarity between images, comprising:
- performing, for each of the images, the following steps:
  (a) segmentation of the image into segments,
  (b) classification of the segments as a function of their orientation to give classes,
  (c) calculation of a histogram of the number of segments as a function of class,
  (d) calculation of a histogram of the number of pixels belonging to the segments of one and the same class as a function of class,
- comparing, for each image, the histograms calculated above to their respective histograms calculated for each of the rest of the images to give a measurement of similarity.

C. Replace claim 2 with the following:

2. Method according to Claim 1, also calculating a third histogram corresponding to the distribution of the segments about the centre of gravity of each class.

D. Replace claim 3 with the following:

3. Method according to Claim 2, wherein, to calculate the third histogram, it performs a calculation of the standard deviation of the distances from the middles of the segments of a class to the centre of gravity of the class considered.

E. Replace claim 4 with the following:

4. Method according to Claim 1, characterized in that wherein the comparison of the histograms consists of a subtraction of the ordinates class by class and of a sum, over the set of classes, of the subtraction result obtained for each class.

F. Replace claim 9 with the following:

9. Device for measuring similarity between images, comprising a circuit capable of
   - receiving digital data defining the images
   - performing, for each of the images, the following steps:
     (a) segmentation of the image into segments,
     (b) classification of the segments as a function of their orientation to give classes,
     (c) calculation of a histogram of the number of segments as a function of class,
     (d) calculation of a histogram of the number of pixels belonging to the segments of one and the same class as a function of class,
   - comparing, for each image, the histograms calculated above to their respective histograms calculated for each of the rest of the images to give a measurement of similarity.

Allowable Subject Matter

3. Claims 1-9 are allowed.

4. The following is an examiner's statement of reasons for allowance:

A. Regarding claim 1, and similarly claim 9, closest art of record Yoo et al. [P. 354, sects. 3.31-3.4], Jain et al. [P. 1236, sect. 4.2 & P. 1238, sect. 4.3] (both cited in the IDS), Hampapur et al. [Fig. 5B, ref. 240 & Fig. 7, refs. 6.4, 6.6, 6.7] and Wang (US 6,674,915) [Fig. 2B, refs. 120, 140 & 145] all disclose using orientation histogram of edge pixels (rather than edge segments each comprising connected edge pixels) either alone or as a component (along with, say, a color histogram) of a similarity measure for image matching or retrieval. On the other hand, Hart, Jr. et al. (US 6,130,706) discloses [Fig. 3A; Col. 4, line 62-Col. 5, line 28 and Col. 6, lines 23-25] a method that first obtains edge segments of a given region followed by the construction of a histogram of the orientations of the edge segments from which the orientation of the region is determined; the histogram is not used as a structural feature of the region. Syeda-Mahmood (US 6,108,444) and Fan et al. (US 6,075,892) both disclose segmenting an image and determining the orientation of each of the segments for the purpose of detecting handwritten text lines (Syeda-Mahmood) or determining font attributes (Fan); an orientation histogram of the segments is constructed in the process but again the histogram is not used as a structural feature of the region. Le (US 5,592,572) discloses

segmenting an image and determining the orientation of each of the segments for the purpose of determining the orientation of the image.

None of the references cited above, alone or in combination, disclose, teach or suggest first segmenting an image and clustering the resultant segments based on their orientations then counting the number of segments in each cluster (i.e., a class corresponding to an orientation) as well as the total number of pixels in each cluster (i.e., constructing the two histograms as recited in the claim), and finally using the two histograms to calculate the similarity between images.

5. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Yubin Hung
Patent Examiner
Art Unit 2624
December 28, 2006

JINGGE WU
SUPERVISORY PATENT EXAMINER